Ambient Ammonia Monitoring Technologies

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The performance of seven ambient ammonia monitoring technologies was recently verified by the U.S. Environmental Protection Agency (U.S. EPA) Environmental Technology Verification (ETV) Program's Advanced Monitoring Systems (AMS) Center. The technologies were tested under a U.S. EPA cooperative agreement with Battelle Memorial Institute in collaboration with the U.S. Department of Agriculture National Soil Tilth Laboratory.

Ambient emissions from animal feeding operations (AFOs) account for approximately 65% of the national ammonia emissions, based on 2002 emission data. Decision-makers within the environmental industry need high-quality, credible performance data to evaluate ammonia monitoring technologies under the conditions at and near AFOs. The seven technologies verified by the AMS Center (Table 1) could be used to enhance scientific understanding of the environmental effects of ammonia concentrations on the emissions at AFOs. The ammonia monitors were evaluated on a number of performance parameters including relative accuracy, linearity, precision, response time, calibration and baseline drift, interference effects, comparability to a reference method, ease of use, and data completeness. The verification test was conducted in two phases, each at separate AFOs. Phase I was conducted at a swine finishing farm and Phase II was conducted at a cattle feedlot. All tests were performed in accordance with the Test/QA Plan for the Verification of Ambient Ammonia Monitors at Animal Feeding Operations (http://www.epa.gov/etv/pdfs/testplan/01_tp_ammonia.pdf). The results of this performance verification can be found at http://www.epa.gov/etv/verifications/vcenter1-30.html. These performance data will assist users of ammonia monitoring technologies, such as farm owners, researchers, permitters, and regulatory agencies, to better control ammonia emissions through better monitoring. Real-time monitoring data will enable users of this type of technology to evaluate the efficacy of control technologies and management plans intended to reduce ammonia emissions at AFOs.

Table 1. Verified Ambient Ammonia Monitors

Vendor	Verified Technology
Aerodyne Research, Inc.	QC-TILDAS
Bruker Daltonics	OPAG 22 Open-Path Gas Analyzer
Molecular Analytics	IonPro-IMS Ammonia Analyzer
Omnisens SA	TGA310 Ammonia Analyzer
Pranalytica, Inc.	NitroluxTM 1000 Ambient Ammonia Analyzer
Mechatronics Instruments BV	AiRRmonia Ammonia Analyzer
Thermo Electron Corp.	Model 17C Ammonia Analyzer